

Research on Online Trust in C2C E-Commerce Based on Institutions

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Abstract—Online trust crisis restricts consumers from online business. It is important to improve online trust for C2C electronic commerce. From the view of customers, this paper firstly compartmentalizes online trust into three parts, trust to online environment, websites and sellers, followed by an empirical research on antecedents of three types of trust. Multiple regression analysis on 1428 effective questionnaires shows that individual trust tendency has positive effect on trust. However, the regression coefficient of the environmental trust is the highest among the three coefficients. The validity of the reputation feedback, the real name authentication, the third party payment, the interaction and communication have significantly positive effect on the trust to websites. The regression coefficient of the validity of the third party payment is the highest among them; Sellers' reputation has significantly positive effect on the trust to sellers but the sellers' scale does not have significant effect on it.

Keywords—electronic commerce; consumer to consumer; trust to website; trust to sellers

I. INTRODUCTION

Consumer to Consumer (C2C) e-commerce is an effective trade flat. Buyers can search what they need quickly among plenty of merchandises while sellers can find large numbers of buyers who are interested to their merchandises. With the development of e-commerce, the C2C e-commerce grows fast. According to the new survey from the Yiguan International, the trade value of C2C e-commerce achieves 135.9 billion RMB in the third quarter 2010[1]. However, comparing to total denizen population, the number of people who purchase online is relatively small. From CNNIC, risk and lack of trust are the main reasons that impede the development of C2C e-commerce [2]. Specifically, uncertainty, high risk, anonymity and obvious asymmetric information make trust the key element of e-commerce.

How to improve customers' trust in e-commerce circumstance is an important issue. The investigators and industrialist in the e-commerce trade flat and e-commerce development domain should pay attention to this issue. The former researches have been focusing on the customers trust to online stores in Business to Customer (B2C) model [3-6]. In the B2C trade model, researchers mainly focus on buyers trust sellers. However, in the C2C trade mode, researches focus on the trust between sellers and buyers, the relationship between buyers and auction sites, as well as sellers and auction sites. Trust issues in the C2C e-commerce business is discussed in this paper. The paper divides the C2C e-commerce online trust into three parts including the trust to online environment, trust to website platform, and trust to sellers, and the factors affecting three types of trust are also discussed.

II. LITERATURE REVIEW

Trust is a multidisciplinary concept. Before the e-commerce appears, trust has been widely studied in sociology, philosophy, organization theory and other subjects' research. Scholars focused on two different points of view to define the consumers' trust. One focuses on the trading environment, from the view of consumers' trust, such as Corritore (2003) [7]. They think online trust is an attitude that trust subjects to their expectation in online environment. The other focuses on trading relationships, give the definition from the view of customers' trust, such as McKnight et al.(1998, 2002)[8,9], they think trust is the faith that individuals put up to the trust targets in good will, competence, integrity and predictability.

Consumers' trust under C2C e-commerce is our research departure point, so we define online trust from the perspective of the trading relationship. Auction platform and sellers are two different trust objects in C2C e-commerce. The traders consider the website as a transaction platform, they register users' name, unregistered personal information in the platform, and they impress transaction information, finish the trading activities through the platform. The trust of online consumer to network environment and auction website is the first problem for the online transactions. As the online trading market intermediary, C2C e-commerce platform does not participate in the transactions directly, but it constitutes the trading rules, manages the users, constructs the safety and credible business environment, in order to achieve the trust transfer between buyers and sellers, promote the e-commerce trust instauration. The paper puts forward three different types of trust beliefs in C2C e-commerce: trust to network environment, trust to online auction platform and trust to sellers.

Because of the importance of consumers' trust, many scholars discussed the factors that influence online trust. Urban et al.(1999) [10] point out that the information amount, quality, practicability, agonistic and integrated information, fulfill commitments will affect consumer confidence. Privacy and security motivate the research of online trust. Consumers pay more attention on network security than personal privacy (Belanger et. al., 2002) [11]. The factors influencing online trust can be divided into different types including website features, users' features and other features (Shankar et. al., 2002) [12]. Site features include user-friendly interface, commitment, community building, privacy protection, security protection, the third-party certification mark, brand, website life, product selection, information timeliness, the links to other related sites; users' features include: network technology, the previous online trading experience, the orientation of web, the technology tendency, control abilities; the other features

include: online trading environment, reliability of net company, company scale, company reputation, communication, personality and collaborative capabilities etc. Dan Kim et al.(2005)[13] argue that the e-commerce trust is six-dimensional model, namely, technology, behavior, institution, information, products and trading. Mary et. al. (2006) [14] think that concerns to privacy and reputation inflect online purchase intention through online trust. There are a large number of factors affecting online trust in online shopping. Many scholars discuss the factors related to website, such as site characteristics, quality, information, useful, ease of use and etc.

Abdul Rahman(2000), McKnight(2001)[15,16] and other scholars mention the institutional trust and system trust when they discuss trust. The institutional trust is an important trust pattern. Through institutional trust, trust can be established between strangers (Zucher, 1986)[17]. The institution contains social cultural, jurisprudence etc. But there is little research on institutional trust. Pavlou (2002, 2003)[18,19]discusses the institutional trust based on B2B and B2C e-commerce market using survey samples. In C2C e-commerce mode, not only trust between traders is important, but also the website trust is important. Therefore, the paper discusses the trading trust under C2C e-commerce mode, dividing trust into three dimensionalities including Net Environment's Trust (NET), Website's Trust (WT), and Seller's Trust (ST), which is defined as the customers' belief to net technology, network security and reliability, customers' belief to the good faith, integrity, ability, behaviour predicted of the site, customers' belief to good faith, integrity, ability, behaviour predicted of the sellers.

III. FRAMEWORK AND RESEARCH HYPOTHESES

A. Individual Trust Tendency

Trust tendency is a stable individual internal factor. It refers to personal incline to rely on others in generic circumstances. Researches in the field of social and psychology show that trust tendency is different for people. People have different trust tendency because of their different experience and environment. Trust tendency will affect consumers' trust to online stores and sites [20]. The higher trust tendency, the more distinct the trust degree and attitude occurs. According to the theoretical models and the empirical evidence pointed out by previous work, we propose the following hypotheses:

H1: Trust tendency positively influences customers' trust to online environment.

H2: Trust tendency positively influences customers' trust to auction sites.

H3: Trust tendency positively influences customers' trust to online sellers.

B. Correlative Institutions about C2C E-commerce sites

Nowadays C2C e-commerce sites have adopted a variety of services and transaction management mechanisms to guarantee online transaction security. Through literature review and deep interviews with online auction sites users, we find that there are

some online transaction management mechanisms widely used in the sites: Reputation Feedback (RF), Real Name Authentication (RNA), the Third Party Payment (TPP), Interaction and Communication (IC) and so on.

1) Validity of reputation feedback, namely, the validity of online reputation feedback systems and credit evaluation rules. Reputation plays a very important role in transaction trust building. When the traders have no historical transaction, word of mouth is an important factor to attract users. The reputation feedback mechanisms contain online reputation systems and credit evaluation rules. Different sites have different credit evaluation rules. In Taobao, many users may give their comments on the service and goods after finishing the transactions, 'good appraisalment will receive one positive point, and negative feedback will receive one negative point. Online reputation feedback systems collect the appraisalment and compute users' trust degree. The sites will give credit rating based on users' cumulative trust degree. The feedback mechanisms save all transactions and correlative credit appraisalment of each trader, and provide the traders' reputation through feedback forum. Consequently, the validity of reputation feedback mechanisms can improve traders' reliability. According to the empirical evidence pointed out, the following hypothesis is proposed:

H4 : The validity of reputation feedback mechanisms influences customers' trust to auction sites.

2) Validity of real-name authentication, which means effectiveness of the system that the trading platform using to confirm the registered users' identity. Real-name authentication is a system that the trading platform adopted to affirm users' identity in order to ensure the users' registered name and real name are unique. The multiplicity of users' identity will cause falsehood transactions and identity replacement transactions. Real-name authentication through credit card or identity card can guarantee the authenticity and uniqueness of users' identity, and improve the confidence to sites, so the following hypothesis is proposed:

H5 : The validity real-name authentication influences customers' trust to auction sites.

3) Validity of the third-party payment. Escrows are the third-party services through which a third-party authorizes payment after a buyer is satisfied with the products. The third-party services ascertain that all exchanges are conducted as per the established standards for quality and delivery. The third-party payment protects both buyers and sellers. The service operates by the first receiving and holding a buyer's payment. Once payment is secured, the TTP notifies sellers to ship the merchandises. When satisfactory merchandise is received, the TTP give the payment to sellers. If the merchandise is unsatisfactory, the buyers return it, and the payment is credited back to buyers by the TTP provider. The TTP can monitor the funds in the trading entirely, and protect the financial security. According to the former research and empirical evidence, the following hypothesis is proposed:

H6 : The validity third-party payment influences customers' trust to auction sites.

iv) Validity of the interactive communication. Websites can constitute specific rules to deal with the irregularity behaviors. Users can report irregularity behaviors and websites can deal with them according to the rules. From the perspective of social interaction and social exchange theory, trust is set up by the process of interactive exchanges. C2C e-commerce sites establish special rules to deal with all kinds of irregularity behaviors. When there is fraud behavior, both buyers and sellers can make complaints to the auction sites. The more rapid speed dealing with complaint, the more trust to sites. Interactive communication shows positive attitude between traders and the communication will affect buyers' trust to sellers (McKnight et al., 2002) [9]. Using Live Messenger, QQ and other real-time chat tool can let users obtain the information easily, and they enhance trust to websites and sellers. Therefore, the following hypothesis is proposed:

H7: The validity interactive communication influences customers' trust to auction sites.

H8: The validity interactive communication influences customers' trust to sellers.

C. Sellers' Character

1) Seller's Reputation (SR). Good credit can prevent bad dealers from entering the market and help traders to reduce risk in the trading process. Reputation is one important alternative source of trust (McKnight, 2002; Zucker, 1987) [9, 17]. Reputation plays key role in the business when one is lack of understanding against another. The sellers' high reputation indicates that sellers have got many good appraisements in the former transactions. Other people will think the seller is credible, so new buyers have no reason to consider the seller will cheat in one specific transaction. So, the following hypothesis is proposed:

H9: The sellers' reputation influences customers' trust to sellers.

2) Seller's Scale (SS). It defined as the number of selling product categories and amount of selling products. According to the financing advantage theory, the larger the enterprise scale, the public know more information, and the information is more transparent. When the enterprise meets operation risk, the larger enterprise can get out through many approaches easily. Petersen(1997)[21]analysed the credit of American large and small enterprises using NSSBF model, and got the conclusion that larger enterprises can get much more commercial credit. In C2C e-commerce market, the larger scale of sellers, the more products they sell in the past, the customers will trust them much more. Therefore, the following hypothesis is proposed:

H10: The bigger of sellers' scale, the buyers will give more confidence to sellers.

In summary, this paper chooses personal trust tendency, reputation feedback mechanism, real-name authentication, interactive communication as the variables to explore relationships between each factor and trust. The theoretical model is constructed in Figure 1.

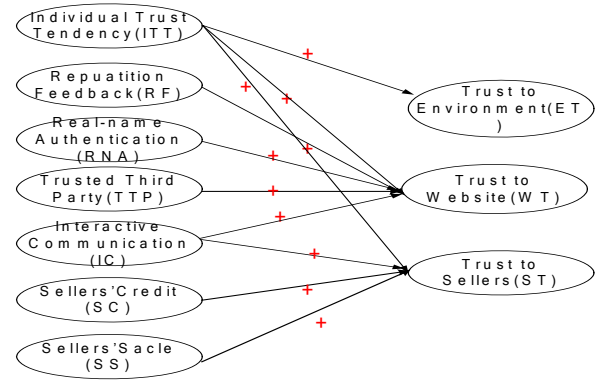


Figure 1 Research Conception Model and Hypothesis

IV. RESEARCH METHODOLOGY

A. Sample and Data Collection

The research data were collected from field survey. We use online survey to collect data. The survey site is: <http://www.xuanda-yy.cn/tongji/tongji.html>. The survey starts from May 20, 2008 to July 30, 2008. We invite university campus computer room, internet bar and offices to involve the survey. Meanwhile, invite friends to complete the questionnaire through Live Messenger and email. The paper choose Taobao users as survey objects because Taobao hold 80.0% market share in Chinese C2C e-commerce market. We get 1428 valid questionnaires in the survey. There are 726 samples that have shopping experience in Taobao among the samples, accounting for 50.8%. The basic situation of the sample is shown in Table 1.

According to the latest CNNIC survey, there are 57.2% male, and 19-30 year-old users occupy 49.9% among the current Internet users. The distribution of survey samples is basically reasonable in demographic characteristics.

B. Developing the Measurements

1) Questionnaire. According to Churchill (1979), Anderson & Gerbing (1988) recommendations, we get the measurements step by step. a) Scanning the top journals in recent years, finding the measurements of each variable and carrying through past translation (invite friends in foreign to translate English into Chinese, and then translate Chinese questionnaire into English, comparing with the original, repeat three times. (Parameswaran&Yaprak, 1987) . b) To ensure the measurements validity, based on deep interviews of 15 Taobao users who have much shopping experience, we amend the items in order to assure the items according to Chinese situation. c) Confirming the preliminary measurement, and actualize pre-survey, and the sample number is 70. d) According to pre-survey questionnaire results, revising the items and modifying the formal questionnaire. The questionnaire contains ten variables, such as "trust to online environment", "trust to sellers", "interactive communication" etc. The questionnaire uses Likert 7-point scale, which one representing "strongly disagree" and seven indicating "strongly agree".

2) Reliability and validity. First the paper checks the questionnaire validity using explored factor analysis by SPSS11.5. Using principal component factor analysis to every latent variable and orthogonal rotation, delete the items that have low factor loading. Using ITT1, ITT2, ITT3, ITT4 to measure individual trust tendency, ET1, ET2, ET3, ET4 to measure customers' trust to environment, WT1, WT2, WT3, WT4 to measure customers' trust to websites, RF1, RF2, RF3, RF4 to measure reputation feedback mechanism. The factor loading of each item on the corresponding variables is shown in table 2. Confirmatory factor analysis (CFA) with LISREL8.73 was used to test the measurement model and establish convergent and discriminated validity of the constructs. From table 2, the factor loading of each item is larger than 0.5, and the POVEI of each variable is greater than 0.5, which indicating that the latent variable have good structure validity.

The POVEI of each latent variable is greater than square of correlation coefficient between variables, which indicating that the items have good discriminate validity. The Cronbach's alphas of each variable are above 0.7, which indicating that the questionnaire has good reliability. The questionnaire has well reliability and validity, and it can be used to measure the corresponding concept.

V. DATA ANALYSIS

Regression analysis was chosen for data analysis. First test if the data is suitable for regression analysis. Durbin-Watson statistic was used to test residuals independence and the tolerance and variance inflation factor was used to test the multi-collinearity of variables, the residual scatter plots were used to test the linearity relations of the data, the residuals histograms and cumulative probability diagram was used to test if the data follows a normal distribution.

A. Trust to Net Environment

Trust to net environment (ET) was considered as dependent variable, and individual trust tendency (ITT) as independent variable. A simple linear regression was established to test hypothesis 1. $ET_i = b_0 + b_1 ITT_i + \varepsilon_i$, ET_i means the users' i trust to net environment, ITT_i means user's i personal trust tendency, b_0 is the constant item of the regression equation while ε_i is random error term. The linear regression was used to estimate the model. The regression results show that the model fit is good ($F=190.794$; $R^2=0.118$; $p=0.000$), and $b_1=0.344$ ($p=0.000$). It means that consumers' individual trust tendency has a significant positive effect on trust to network environment. That is, the hypothesis 1 is supported.

B. Trust to Websites

Trust to websites(WT) was considered as dependent variable, and individual trust tendency (ITT), reputation feedback(RF), real-name authentication (RNA), the trusted third party(TTP), interactive communication(IC) as independent variable. The linear regression was established to test hypothesis 2 and 4-7. The regression result is shown in table 3.

Form the table 3, we can see the D-W value is 1.860. It means that residual error sequence has no significant negative autocorrelation. The tolerance value of TTP、RF、ITT、RNA、IC is 0.806, 0.885, 0.924, 0.776, 0.893 respectively, and the VIF value is 1.231, 1.134, 1.082, 1.380, 1.117, which are relatively close to 1. It means that the five independent variables have no multi-collinearity. From the error distribution figure and residual histograms, the five independent variables have linear relationship with WT. The data is fit to linear regression analysis.

The five independent variables can enter regression model, the multiple correlation coefficient was 0.683 and the joint variance was 0.465. it means that the five independent variables can determine WT 46.5% in the variance. The standardized regression coefficient of third-party payment is 0.299, greater than the other coefficient. The p-value of five independent variables is all 0.000. So hypothesis 2, 4,5,6,7 is supported by the data.

C. Trust to Sellers

Trust to sellers (ST) was considered as dependent variable, and individual trust tendency (ITT), interactive communication(IC), sellers' reputation (SR), sellers' scale (SS) as independent variable. The paper chooses linear regression to test hypotheses. The regression result is shown in table 4.

As can be seen from Table 4, the co-linearity between each variable is not obvious. The standardized regression coefficients show that the interactive communication, sellers' reputation, personal trust tendency have a positive influence on customers' trust to sellers. But sellers' scale has no significant effect on trust to sellers. From the standardized regression coefficients, we can see that the effectiveness of interactive communication is higher than sellers' reputation. Therefore, we can accept hypothesis 3, 8, 9 and reject hypothesis 10.

VI. CONCLUSIONS AND SUGGESTIONS

A. Conclusions

This paper uses multiple linear regressions to validate the theory model. All the hypotheses are supported except hypothesis 10 by the empirical data.

1) Individual trust tendency has significant positive effect on the trust. The regression coefficient of trust to net environment is 0.344, while the coefficient of trust to websites and trust to sellers is 0.144,0.173. Individual trust tendency is consumers' personal idiosyncrasy and general attitude to trust. It is independent of the website. As a new business model, trust to network environment is influenced by trust incline, but the specific sites and sellers are in the micro level, so the coefficient is smaller.

2) The third-party payment and reputation feedback have high direct effect to websites' trust. Some online transaction management mechanisms have been used in the websites. The influence degree is different, but it is certain that the four trading mechanisms will promote customers' trust to websites.

TABLE 1: DISTRIBUTION OF SAMPLE

Classify	Sample distribution
sex	Male 56.2%; female 43.8%
age	Under 18 9.0%, 19-25 80.3%, 26-35 16.0%, above 35 2.8%
education	Under senior high school 3.6%, junior college 17.4%, undergraduate 63.6%, master 15.4%
time contact net	Under 2 years 10.1%, 2-4 years 21.8%, 4-6years 32.6%, above 6 years 35.5%
online frequency	Every day 47.4%, 4-6days every week 22.3%, 2-3days every week 21.8%, seldom 8.5%
experience	male has online shopping experience account for 49.0%, while female account for 53.2%

TABLE 3 REGRESSION COEFFICIENTS OF THE FACTORS THAT EFFECTING WEBSITE TRUST AND SIGNIFICANT TEST

	Un-standardized coefficients		Standardized coefficients	T	Sig	Col-linearity statistics	
	B	Std. Error	Beta			Tolerance	VIF
constant	.320	.127		2.514	.010*		
TTP	.288	.026	.299	11.055	.000***	.806	1.231
RF	.240	.030	.223	8.040	.000***	.885	1.134
ITT	.127	.018	.144	7.124	.000***	.924	1.082
RNA	.118	.024	.116	4.919	.000***	.776	1.380
IC	.131	.032	.121	4.126	.000***	.893	1.117
R-squared	0.465						
F value (P value)	248.732 (0.000***)						
Durbin-Watson	1.860						

* p<0.1; **p<0.05; ***p<0.01;

TABLE 4 REGRESSION COEFFICIENTS OF THE FACTORS THAT EFFECTING SELLERS' TRUST AND SIGNIFICANT TEST

	Un-standardized coefficients		Standardized coefficients	T	Sig	Col-linearity statistics	
	B	Std. Error	Beta			Tolerance	VIF
constant	1.265	0.163		7.759	0.000***		
IC	0.298	0.026	0.278	11.396	0.000***	0.883	1.133
SR	0.191	0.033	0.178	5.719	0.000***	0.861	1.162
ITT	0.179	0.022	0.173	8.165	0.000***	0.937	1.067
SS	0.089	0.035	0.079	2.534	0.011**	0.789	1.267
R-squared	0.253						
F value (P value)	120.227 (0.000***)						
Durbin-Watson	1.993						

*p<0.1; **p<0.05; ***p<0.01;

TABLE 2: RELIABILITY AND VALIDITY ANALYSIS OF THE VARIABLES

Variable name	item	loading	Variable name	item	loading	Variable name	item	loading	Variable name	item	loading
Individual trust tendency α =0.900 POVEI=0.722	ITT1	0.882	Trust to net environment α =0.865 POVEI=0.722	ET1	0.854	Trust to website α =0.878 POVEI=0.632	WT1	0.880	Reputation feedback mechanism α =0.819 POVEI=0.733	RF1	0.785
	ITT2	0.912		ET2	0.856		WT2	0.870		RF2	0.815
	ITT3	0.902		ET3	0.860		WT3	0.834		RF3	0.809
	ITT4	0.815		ET4	0.802		WT4	0.841		RF4	0.811
Trust to sellers α =0.943 POVEI=0.703	ST1	0.942	real-name authentication α =0.718 POVEI=0.671	RNA1	0.859	The trusted third party α =0.888 POVEI=0.681	TPP1	0.877	interactive communication α =0.876 POVEI=0.631	IC1	0.864
	ST2	0.957		RNA2	0.847		TPP2	0.917		IC2	0.911
	ST3	0.944		RNA3	0.690		TPP3	0.918		IC3	0.910
Sellers' reputation α =0.849 POVEI=0.670	SR1	0.875	Sellers' scale α =0.842 POVEI=0.683	SS1	0.854						
	SR2	0.911		SS2	0.898						
	SR3	0.845		SS3	0.863						

3) Sellers' reputation has significant positive effect on customers' trust to sellers. The higher reputation degree the sellers got the more confidence buyers to sellers. But the sellers' scale has no significant effect on trust. In C2C e-commerce market, buyers and sellers are individual, their scales have no significant differences, and most sellers only provide single type of products.

B. Suggestions

Although there has been vigorous development in Chinese C2C e-commerce, trust is a bottleneck factor hampers further development of e-commerce. Compared with large numbers of Internet users, the portion of online shopping customers is still very small. Based on this research, we put forward some proposals to improve trust confidence in C2C e-commerce. It can attract more users to participate in online purchasing.

1) Focusing on users' trust to network environment. A customer who has high trust tendency may not trust a special website, but a customer who has high trust to network environment will trust the site. Therefore, the websites can invest more resources to improve customers' confidence in shopping environment, e.g. strengthening online shopping environment security, building up the public image of the online stores and online site platform.

2) Strengthening the construction of formal constraints, consummating the e-commerce laws and regulations, and improving the third-party payment and third-party certification services. It is necessary to build up an independent third-party trust authentication mechanism, which can act on credit rating to online auction sites and sellers.

3) Improving the construction of online reputation feedback systems in C2C e-commerce. The validity of reputation feedback systems has a significant impact on trust to sites. But due to defects of the current network technology and lack of

legal environment, there are many issues to solve in the reputation feedback systems, e.g. the credit evaluation score has nothing to do with the transaction amount and the trading time. The traders can improve their credit through self-purchase by signing up for different users' names. There are many factors affecting the confidence of consumers' trust to C2C website, such as malicious recommendation, credit speculation, conspiracy and so on.

iv) Increasing buyers and sellers' confidence in the process of communication with trading partners. The communication in buying process is very important, as it can improve the confidence. Reputation affects customers' trust to sellers. When a user tends to sell for a long time in the auction site, he would pay attention to his accumulated reputation. Good appraisalment will bring users' high reputation, which is a signal to impress his good image.

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